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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,372	12/10/2001	Tomio Sugiyama	P 283339 U3-9818-TS-A	1390

23117 7590 05/21/2004

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EXAMINER	
OLSEN, KAJ K	

ART UNIT	PAPER NUMBER
1753	

DATE MAILED: 05/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/006,372	SUGIYAMA ET AL.	
	Examiner	Art Unit	
	Kaj K Olsen	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14,16 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14,16,17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0 678 740 A1 (hereafter "EP '740") in view of either Oshima et al (USP 6,071,393) or WO 95/30146 (hereafter "WO '146").

4. EP '740 sets forth a gas sensor comprising a reference gas chamber 10 and a sample gas chamber 8 defined by at least one solid electrolytic substrate; a sample gas introducing passage (12, 50, or 52) for introducing a sample gas into said sample gas chamber (col. 12, lines 1-17). EP '740 further discloses a first solid electrolytic substrate 4a having an inside surface defining a wall of said sample gas chamber and an outside surface to be exposed to said sample gas before

said sample gas is introduced into said sample gas chamber (fig. 17 and col. 11, lines 27-38). EP '740 further discloses a pump cell including first and second pumping electrodes (16, 18) provided on said first solid electrolytic substrate, said first pumping electrode being arranged so as to be exposed to said sample gas before said sample gas is introduced into said sample gas chamber, and said second pumping electrode being arranged so as to be exposed to the sample gas introduced into said sample gas chamber via said sample gas introducing passage, so that oxygen gas residing in said sample gas chamber is discharged from said sample gas chamber by predetermined amount via said sample gas introducing passage when a voltage of a power source is applied between said first and second pumping electrodes (col. 14, lines 9-16). EP '740 further discloses a second solid electrolytic substrate 4c having a surface defining a wall of said sample gas chamber and another surface defining a wall of said reference gas chamber; an oxygen sensor cell having first and second oxygen sensing electrodes (22, 24) provided on said second solid electrolytic substrate to measure all oxygen concentration of said sample gas residing in said sample gas chamber, said first oxygen sensing electrode being arranged so as to be exposed to the sample gas stored in said sample gas chamber and said second oxygen sensing electrode being arranged so as to be exposed to a reference gas stored in said reference gas chamber (fig. 17 and 18). EP '740 further discloses a NOx sensor cell having first and second NOx sensing electrodes (28, 24) provided on said second solid electrolytic substrate, said first NOx sensing electrode 28 being arranged so as to be exposed to the sample gas stored in said sample gas chamber and said second NOx sensing electrode 24 being arranged so as to be exposed to the reference gas stored in said reference gas chamber, to measure a NOx concentration of the sample gas residing in said sample gas chamber after the discharging of

oxygen gas by said pump cell is performed in response to a voltage of a power source applied between said first and second NOx electrodes (col. 15, lines 15-47). EP '740 further discloses a heater member 36 provided for heating said first and second solid electrolytic substrates, said heater number being located far from said first solid electrolytic substrate and close to said second solid electrolytic substrate via said reference gas chamber (fig. 17, 18, and paragraph bridging col. 17 and 18). EP '740 further discloses an ammeter 32 serially connected between said power source and said first NOx sensing electrode of said NOx sensor cell to detect a limit current value representing the NOx concentration of the sample gas residing in said sample gas chamber (fig. 13, lines 31-40).

5. EP '740 does not explicitly disclose the presence of a second ammeter serially connected between said power source and said first pumping electrode of said pump cell. Oshima discloses in an alternate NOx sensor that a second ammeter 16 connected to the pump cell 6 can be utilized for the determination of the oxygen content of the exhaust gas (fig. 10; col. 3, lines 2-13; and col. 17, lines 58-66). WO '146 also teaches in an alternate NOx sensor that an ammeter 8 on the pump cell of sensor can be utilized for the measure of oxygen (main paragraph of page 4). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teachings of either Oshima or WO '146 for the sensor of EP '740 in order to provide a simultaneous measure of oxygen (i.e. air/fuel ratio) thereby further increasing the utility of the sensor.

6. With respect to the new limitation requiring the first pump electrode to be farther from the heater than the second pumping electrode, electrode 18 of EP '740 is farther from the heater than electrode 16.

7. With respect to claim 16, see fig. 2 of EP '740.

8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP '740 and either Oshima or WO '146 as applied to claim 14 above, and further in evidence or in view of Joshi (USP 4,879,016).

9. The references set forth all the limitations of the claim and EP '740 further discloses the use of porous layers for the gas introduction passage (fig. 18). The references did not explicitly set forth the use porous solid electrolyte layers. However, Joshi evidences that sintered zirconia electrolytes typically have a theoretical density of 95% (i.e. they are inherently 5% porous) (col. 7, lines 20-26). Hence Joshi evidences that even when high-density electrolytes are desired, there is still some residual porosity owing to the sintering process of the electrolyte and the electrolytes of EP '740, Oshima, and WO '146 are inherently porous. Alternatively, Joshi teaches that a small amount of porosity in the various components of the sensor device provides enhanced oxygen diffusion (col. 7, lines 20-22). Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Joshi for the sensor of EP '740 and Oshima or WO '146 in order to enhance oxygen diffusion which would reduce internal resistances.

Response to Arguments

10. Applicant's arguments filed 3-9-2004 have been fully considered but they are not persuasive. Applicant urges that Oshima does not overcome the deficiencies of EP '740. In particular, applicant urges that fig. 10 does not illustrate the presence of an ammeter. Although the examiner agrees, this point appears to be otherwise irrelevant. Fig. 7 already showed the

ammeter and fig. 10 demonstrates that the operation of that ammeter. Applicant also urges that pumping electrode 6-b is disposed closer to the heater (disposed below layer 5-6), which reads away from the now claimed invention. This point is confusing for a couple of reasons. First, the primary teaching EP '740 showed the first pumping electrode 18 disposed farther from the heater 36 than the second pumping electrode 16 (fig. 2, 11, 17 and 18). Oshima is being relied on for the teaching of the second ammeter, not for its electrode arrangement. The relevant question is not whether Oshima teaches the claimed electrode configuration, but whether EP '740 does. Second, even if the electrode arrangement of Oshima were deemed to be relevant to the question of electrode placement, the examiner doesn't believe the electrode arrangement of Oshima would be in conflict with the claimed electrode arrangement. In particular, electrode 6-a is the electrode that is exposed to the sample gas prior to the introduction of the sample gas into the sample chamber and electrode 6-b is the electrode arranged so as to be exposed to the sample gas in the sample gas (i.e. measuring gas) chamber. See fig. 7 and paragraph bridging col. 13 and 14. Hence, electrodes 6-a and 6-b are functionally equivalent to the claimed first and second pump electrodes respectively, and the first pump electrode of Oshima (electrode 6-a) is farther from the heater than the second pumping electrode (electrode 6-b).

11. Applicant similarly argues that WO '146 also fails to teach the now claimed electrode configuration. Again, the examiner believes that EP '740 already teaches the relevant electrode arrangement and the question of how WO '146 arranges the electrodes is irrelevant. In addition, even if the electrode arrangement of WO '146 were relevant, it wouldn't contradict the claims of the instant invention. In particular, it doesn't appear that WO '146 even teaches the presence of

a heater so there is nothing in WO '146 that would suggest that any of the pump electrodes of WO '146 would be nearer or closer to the heater.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 6:30 A.M. to 4:00 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kaj Olsen Ph.D.
Primary Examiner
AU 1753
May 20, 2004